

# Appendix I

## Criteria for Acceptable Training Courses for Fixed Gauge Users

Handling and use of fixed gauges is restricted to a Authorized User (AU) or requires the direct supervision of an Authorized User. Authorized user is required to complete a eight hour course provided by the manufacturer of the device or any agency approved course. (180 NAC 15-027)

Documentation of fixed gauge radiation safety training must be maintained on file for inspection.

### Criteria for acceptable training course for fixed gauge users:

Courses must be at least eight hours in length.

#### •Radiation Safety and Regulatory Requirements emphasizing practical subjects important to safe use of gauges:

**Types and Characteristics of Radiation:** Model of the Atom; Alpha, Beta, X-ray and Neutron Radiation; Exposure: Natural versus Man-made Radiation; Irradiation versus

Contamination/Internal vs. External; Radioactive Material Used in Fixed Gauges

**Units of Radiation Dose and Quantities of Radioactivity:** Curies, Rad, Rem, Roentgen; Prefixes, SI Units

**Basic Math and Calculations Related to Radioactivity:** Radioactive Decay; Dose Rates; Inverse Square Law; and Half-value Layers

**Biological Effects of Radiation:** Acute, Chronic and Genetic Effects of Exposure; Radiation Protection Standards, The ALARA Philosophy

**Radiation Levels from Radioactive Sealed Sources**

**Methods of Controlling Radiation Dose:** Time, Distance and Shielding

**State and Federal Regulations:** Material control and accountability, applicable regulations, annual audit of safety program

**Licensing and Inspections by regulatory agency**

**Employee protection**

**Need for complete and accurate information**

**Incidents**

**Inventory**

**Record keeping**

**Transfer/disposal requirements**

**Transportation**

#### •Practical explanation of fixed gauge theory and operation:

**Radiation Detection Instruments:** Types of Radiation Survey Meters; Operation, Calibration and Limitation; and Monitoring Techniques

**Operating procedures:** Training and supervision, Personnel monitoring, Availability of procedures, Security, ALARA, Inventory, Record Keeping, Posting Requirements, General Rules of Use

**Emergency procedures:** Preventive measures, Emergency response, Notification Requirements, Case Histories

**Lockout procedures**

**Maintenance procedures**

**Transportation procedures**

**Radiation detection instruments:** Types of radiation survey meters, Operation, Calibration and limitation, Monitoring techniques

#### •Practical Training:

Field training emphasizing radiation safety, including test runs of: Setting up and making measurements with the gauge, Controlling and maintaining surveillance of the fixed gauge,

Performing routine cleaning and lubrications, Packaging and transporting the gauge, Storing the gauge, Following emergency procedures

- Q&A Session**

- Written Exam**

- Exam Review**

## **Training Assessment**

Management will ensure that proposed AUs are qualified to work independently with each type of gauge with which they may work. Management will ensure that proposed RSO's are qualified to work independently with and are knowledgeable of the radiation safety aspects of all types of gauges to be possessed by the applicant. This may be demonstrated by written or oral examination or by observation.

### **Course Examination**

- 25-50 question, closed-book written test -- 70 percent grade
  - Emphasis on radiation safety of fixed gauge on controlled access, storage, use, sealed source location, maintenance, and transportation, rather than the theory and art of making fixed gauge measurements
  - Review of correct answers to missed questions with prospective gauge user immediately following the scoring of the test

### **Agency Approved Course for Authorized Users**

The course examination and instructor qualifications listed below will be used by the Agency to evaluate the approval of a course, plus the course outline listed above.

### **Course Instructor Qualifications**

Instructor should have either:

- Bachelor's degree in a physical or life science or engineering
- Successful completion of a fixed gauge user course
- Successful completion of an 8 hour radiation safety course AND
- 8 hours hands-on experience with fixed gauges

**OR**

- Successful completion of fixed gauge user course
- Successful completion of 40 hour radiation safety course; AND
- 30 hours of hands-on experience with fixed gauges.

**OR**

- The applicant may submit a description of alternative training and experience for the course instructor.

**Note:** Additional training is required for those applicants intending to perform non-routine operations such as installation, initial radiation survey, repair, and maintenance of components related to the radiological safety of the gauge, gauge relocation, replacement, and disposal of sealed sources, alignment, or removal of a gauge from service. See Appendix K - "Non-Routine Operations."